

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A semiconductor device having at least one thin film transistor, said thin film transistor comprising:

a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and

a gate electrode formed adjacent to said semiconductor layer with a gate insulating film interposed therebetween,

wherein said semiconductor layer comprises needle-shaped or column-shaped crystals ~~in which crystal grain boundaries~~ which are substantially aligned in a direction parallel ~~[[with]]~~ to a length direction of said channel formation region,

wherein a standard deviation of S-value of said thin film transistor is within 10 mV/dec for an N-channel type and 15 mV/dec for a P-channel type.

2. (Original) A semiconductor device according to claim 1, wherein said semiconductor layer contains a metal element for promoting crystallization at a concentration of not higher than 1×10^{18} atoms/cm³.

3. (Original) A semiconductor device according to claim 1, wherein said semiconductor device is incorporated into an electronic apparatus selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.

4. (Currently Amended) A semiconductor device having at least one thin film transistor, said thin film transistor comprising:

a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and

a gate electrode formed adjacent to said semiconductor layer with a gate insulating film interposed therebetween,

wherein said semiconductor layer comprises needle-shaped or column-shaped crystals ~~in which crystal grain boundaries~~ which are substantially aligned in a direction parallel ~~to~~ to a length direction of said channel formation region,

wherein a length of said channel formation region is 0.01 to 2 μm .

5. (Original) A semiconductor device according to claim 4, wherein said semiconductor layer contains a metal element for promoting crystallization at a concentration of not higher than 1×10^{18} atoms/cm³.

6. (Original) A semiconductor device according to claim 4, wherein said semiconductor device is incorporated into an electronic apparatus selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.

7. (Currently amended) A semiconductor device having at least one thin film transistor, said thin film transistor comprising:

a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and

a gate electrode formed adjacent to said semiconductor layer with a gate insulating film interposed therebetween,

wherein said semiconductor layer comprises needle-shaped or column-shaped crystals ~~in which crystal grain boundaries~~ which are substantially aligned in a direction parallel ~~to~~ to a carrier flow direction between said source and drain regions,

wherein a standard deviation of S-value of said thin film transistor is within 10 mV/dec for an N-channel type and 15 mV/dec for a P-channel type.

8. (Original) A semiconductor device according to claim 7, wherein said semiconductor layer contains a metal element for promoting crystallization at a concentration of not higher than 1×10^{18} atoms/cm³.

9. (Original) A semiconductor device according to claim 7, wherein said semiconductor device is incorporated into an electronic apparatus selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.

10. (Currently amended) A semiconductor device having at least one thin film transistor, said thin film transistor comprising:

a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and

a gate electrode formed adjacent to said semiconductor layer with a gate insulating film interposed therebetween,

wherein said semiconductor layer comprises needle-shaped or column-shaped crystals ~~in which crystal grain boundaries~~ which are substantially aligned in a direction parallel ~~to~~ to a carrier flow direction between said source and drain regions,

wherein a length of said channel formation region is 0.01 to 2 μm .

11. (Original) A semiconductor device according to claim 10, wherein said semiconductor layer contains a metal element for promoting crystallization at a concentration of not higher than 1×10^{18} atoms/cm³.

12. (Original) A semiconductor device according to claim 10, wherein said semiconductor device is incorporated into an electronic apparatus selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.

13. (Currently amended) An active matrix display device comprising:
a pixel matrix circuit formed over a substrate;
a logic circuit formed over said substrate, said logic circuit having thin film transistors,
wherein each of said thin film transistors comprises:
a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and
a gate electrode formed adjacent to said semiconductor layer with a gate insulating film interposed therebetween,
wherein said semiconductor layer comprises needle-shaped or column-shaped crystals in which crystal grain boundaries which are substantially aligned in a direction parallel ~~[[with]]~~ to a length direction of said channel formation region,
wherein a standard deviation of S-value of said thin film transistor is within 10 mV/dec for an N-channel type and 15 mV/dec for a P-channel type.

14. (Original) An active matrix display device according to claim 13, wherein said semiconductor layer contains a metal element for promoting crystallization at a concentration of not higher than 1×10^{18} atoms/cm³.

15. (Original) An active matrix display device according to claim 13, wherein said semiconductor device is incorporated into an electronic apparatus selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.

16. (Currently amended) An active matrix display device comprising:
a pixel matrix circuit formed over a substrate;
a logic circuit formed over said substrate, said logic circuit having thin film transistors,
wherein each of said thin film transistors comprises:
a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and
a gate electrode formed adjacent to said semiconductor layer with a gate insulating film interposed therebetween,
wherein said semiconductor layer comprises needle-shaped or column-shaped crystals in which crystal grain boundaries which are aligned substantially in a direction parallel ~~[[with]]~~ to a carrier flow direction between said source and drain regions,
~~wherein a standard deviation of S value of said thin film transistor is within 10 mV/dec for an N-channel type and 15 mV/dec for a P-channel type~~ wherein a length of said channel formation region is 0.01 to 2 μm .

17. (Original) An active matrix display device according to claim 16, wherein said semiconductor layer contains a metal element for promoting crystallization at a concentration of not higher than 1×10^{18} atoms/cm³.

18. (Original) An active matrix display device according to claim 16, wherein said semiconductor device is incorporated into an electronic apparatus selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.

19. (New) An electronic device comprising:
a display device having thin film transistors,

wherein each of said thin film transistors comprises:

a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and

a gate electrode formed adjacent to said semiconductor layer with a gate insulating film interposed therebetween,

wherein said semiconductor layer comprises needle-shaped or column-shaped crystals which are substantially aligned in a direction parallel to a length direction of said channel formation region,

wherein a standard deviation of S-value of said thin film transistor is within 10 mV/dec for an N-channel type and 15 mV/dec for a P-channel type.

20. (New) An electronic device according claim 19, wherein the electronic device is selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.

21. (New) An electronic device comprising:

a display device having thin film transistors,

wherein each of said thin film transistors comprises:

a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and

a gate electrode formed adjacent to said semiconductor layer with a gate insulating film interposed therebetween,

wherein said semiconductor layer comprises needle-shaped or column-shaped crystals which are substantially aligned in a direction parallel to a length direction of said channel formation region,

wherein a length of said channel formation region is 0.01 to 2 μm .

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22. (New) An electronic device according claim 21, wherein the electronic device is selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.